



# Tracking Wildlife's Ups and Downs

What FWP biologists learn when they monitor populations and individual animals.

By Tom Dickson

*"Listen."*

Ryan Rauscher leans out his pickup window and tilts his head. It's a half hour before sunup in late April, about 15 miles east of the Rocky Mountain Front near the tiny town of Bynum. Rauscher, the FWP wildlife biologist in Conrad, has driven through darkness

across private land, with permission, to monitor a sharp-tailed grouse "lek." On these open areas amid sagebrush and short-grass prairie, males and some females gather at dawn each spring for the prairie birds' lively mating ritual.

At first the only sound I discern is a flying

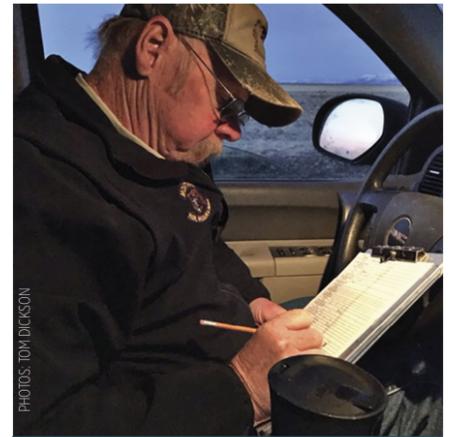
snipe's eerie winnowing. Then I hear it: the staccato chittering of dancing sharp-tailed grouse males. Rauscher leans farther out the window, binoculars trained on the distant commotion. "One, five, eleven...sixteen males, and two hens," he says after a few minutes of watching.

I squint, unable to see a thing in the predawn gray. Finally the white triangles of the male birds' tails appear, 100 yards off, poking up from yucca and grasses.

Before heading for several other leks scattered across the county, we stay a bit longer, watching these birds perform a mating rite that has taken place here every spring for tens of thousands of years.

Sharp-tailed grouse lek counts are among the dozens of wildlife surveys that FWP biologists and other scientists conduct across Montana each year. The surveys range from calculating the size of vast elk and deer herds to tracking individual grizzly bears and pronghorn fawns.

This monitoring is essential. The Montana Legislature requires FWP to manage all of the state's 500-plus wildlife species, especially game animals pursued for meat or fur and those with declining numbers that, if not effectively conserved, could end up under federal protection. Wildlife "management"—making sure healthy populations stay healthy, reducing numbers of species causing problems (like eating too much hay on ranches), and restoring struggling populations—requires making decisions based on



**LOOKING AT LEKS** In the early morning light, Conrad-area FWP wildlife biologist Ryan Rauscher tallies male sharp-tailed grouse seen on a nearby lek. Below: Later he scans another lek for dancing grouse, which perform their mating ritual at the site each spring.



STEVE MITCHELL

# “We have to know how wildlife populations are trending, whether up or down.”

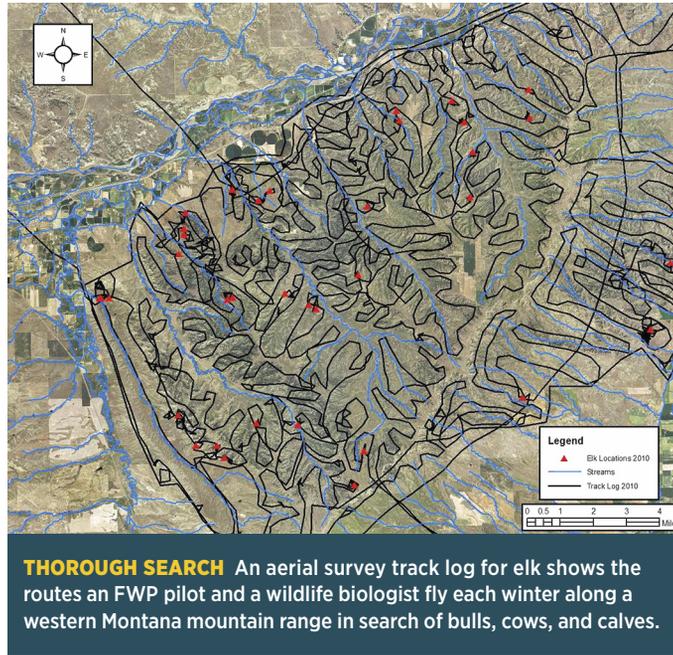
reliable information. “We have to know how populations are trending, whether up or down,” says Justin Gude, chief of the FWP Wildlife Research and Technical Services Bureau. Without that information, wildlife managers couldn’t recommend effective hunting seasons, conserve habitat, or keep species off the federal endangered species list. “Stop monitoring populations and you basically stop managing wildlife,” Gude says.

## MANY METHODS

As any hunter or bird watcher knows, finding animals, especially in forests, is often impossible. Most wild animals are by nature secretive and well camouflaged. That requires a wide range of techniques to find, track, and count them.

For big game animals like elk, mule deer, and pronghorn, biologists fly in two-seater helicopters or airplanes flown by FWP pilots, tabulating what they see below,

*Tom Dickson is the editor of Montana Outdoors.*



following the same transects each winter and early spring. Biologists count ring-necked pheasants by tallying rooster crows at dawn in early May along roadside routes. Like sharptails, sage-grouse are counted when gathered on their springtime leks. Waterfowl numbers are estimated by the U.S. Fish and Wildlife Service in cooperation

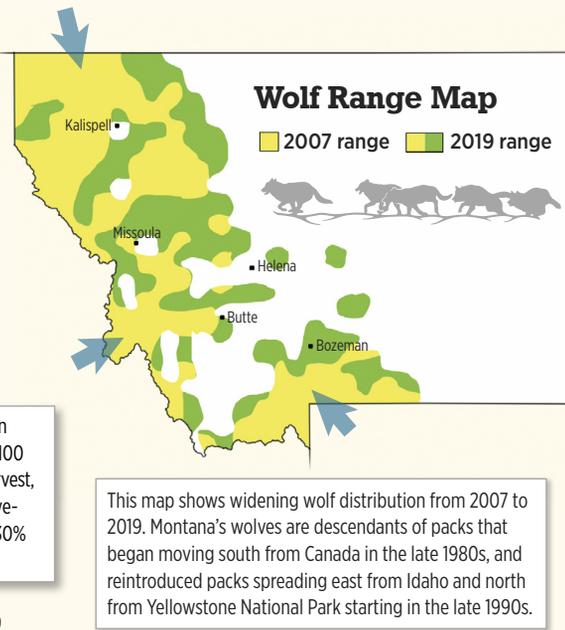
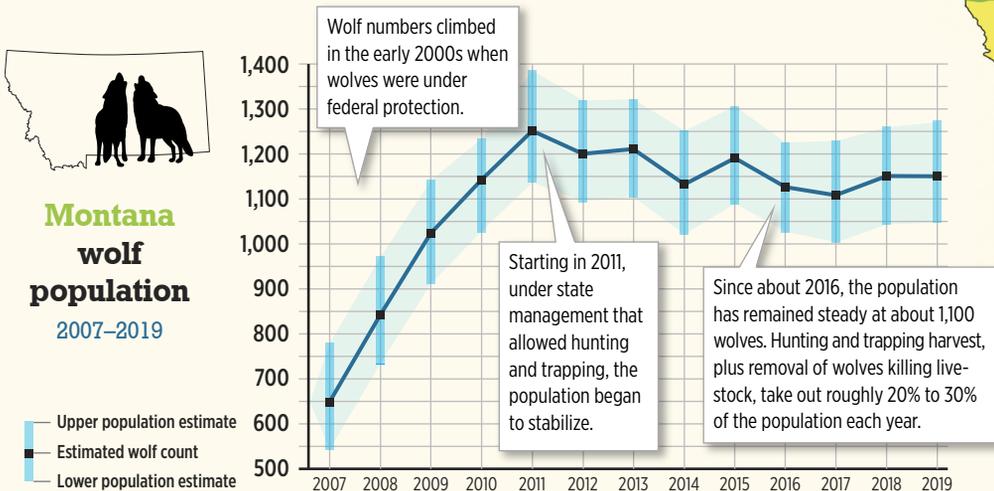
with Montana and other states based on counting breeding ponds in May and broods in midsummer. To count Wolverines and grizzlies, two species that live mostly in remote wilderness, scientists use trail cameras or analyze DNA from hairs snagged on barbed wire surrounding smelly lures.

Biologists also trap individual bears, elk, deer, and other wildlife and fit them with GPS collars to map where the animals go—information vital for understanding habitat needs and migration routes. For instance, biologists have tracked elk leaving Yellowstone National Park to the security of private ranchlands in the Madison Valley in southwestern Montana 60 miles away. They’ve also fitted newborn elk with collars that emit a special signal if the animals die, allowing biologists to race to mortality sites to see what killed the calves.

Using increasingly sophisticated technology, FWP biologists have been keeping tabs on wildlife since the agency’s first inventory

## MONITORING IN ACTION: Using population data to manage Montana’s wildlife

The graph below shows the estimated wolf population in Montana from 2007 to 2019 (latest data). Counts are based on wolf sightings by deer and elk hunters each fall—information gathered from FWP’s winter hunter harvest phone surveys. This data is combined with analyses of pack and territory sizes to estimate Montana’s wolf population.





**MONITORING TOOLS AND TECHNIQUES** Above: An FWP airplane flies low over the Gallatin Range in winter as the pilot and biologist inside search for elk. Clockwise from below left: Using scent attractants surrounded by brass bristle brushes to collect the hair of elusive wolverines for DNA analysis and population monitoring; taking DNA samples of a sedated black bear cub; releasing a cow elk with a tracking collar; checking a trail camera for images of fishers; counting bats in a remote cave; using radiotelemetry to locate the whereabouts of radio-collared mule deer.



# “Few people see deer and elk more regularly than ranchers out checking their herds or fixing fences.”

in 1941. That year Bob Cooney, head of the then-new Wildlife Restoration Division, led a six-person crew that crossed the state on foot, snowshoe, and horseback. The men counted every elk, deer, mountain goat, pheasant, goose, and other wild animals they observed, binoculars in one hand and notebook in the other.

## GETTING QUOTAS “JUST RIGHT”

As was true then, most wildlife tracking these days is used to help biologists figure out annual hunting season harvest numbers, or quotas. FWP biologists survey elk, deer, and other big game populations, estimate harvest from the previous year, then use all that information to present seasons and harvest levels to the Montana Fish and Wildlife Commission for consideration.

The main goal of deer and elk harvest regulations is to prevent population extremes. Underharvested herds end up with too many deer or elk overbrowsing or overgrazing their habitat, hindering native plant growth and leading to starvation and death. The hungry wildlife also eat hay bales, pasture, and crops.

But overharvest a herd and you immediately create a stunted population that denies



**ONLY WHAT THEY COULD SEE** Wildlife monitoring has grown far more accurate and valuable to managers over the past 80 years. Montana’s first surveys were conducted in 1941, when a handful of biologists hiked, rode, and drove across the state, counting animals as they went. Shown here is biologist Merle Rognrud searching for mountain goats on Switchback Pass in 1946 in what later became the Bob Marshall Wilderness.

people opportunities to see or hunt big game.

To get harvest quotas “just right,” biologists need detailed and accurate information. Otherwise they have to be extra conservative with their harvest quota recommendations, says Brian Wakeling, chief of the FWP Wildlife Management Bureau. “We can’t risk taking too many does or cows, which could set a population back for years.”

Because it’s impossible to count every animal, biologists use different scientific methods to get a fix on populations. Rather than determine the exact size of populations (which is not even necessary), they estimate population trends—upward, downward, or stable.

For instance, biologists count the number of mule deer bucks, does, and fawns seen from the air in each of 101 “survey areas”

MERLE ROGNRUD PHOTO COLLECTION. MONTANA’S WILDLIFE LEGACY

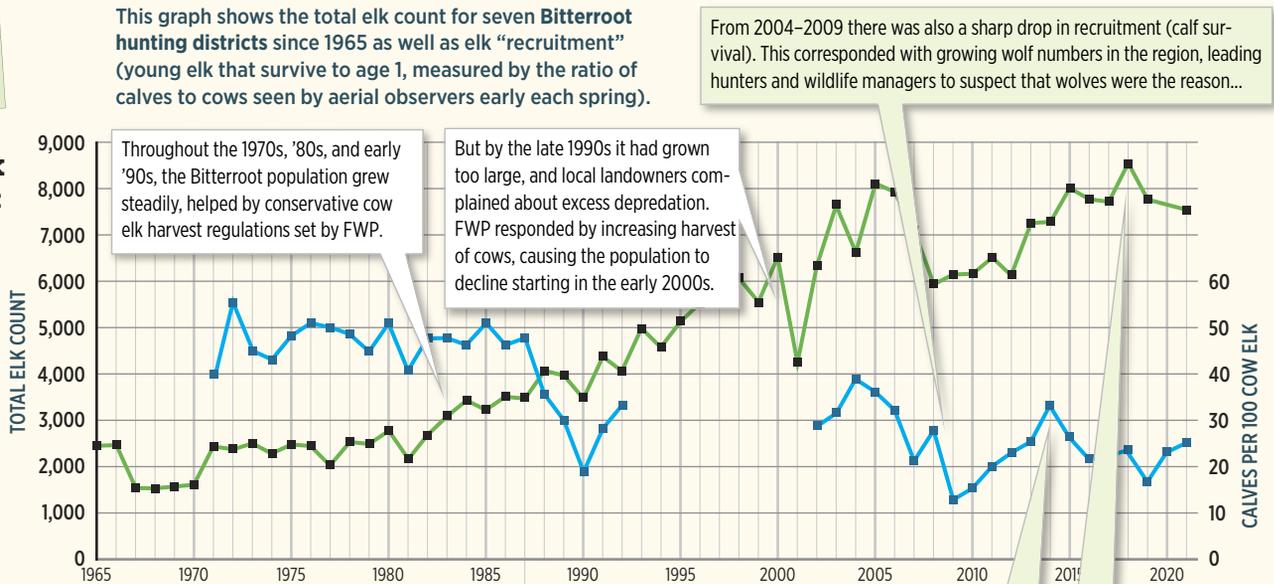
## MONITORING IN ACTION: Using population data to manage Montana’s wildlife



### Bitterroot elk population & recruitment

1965–2021

■ Total elk count  
■ Calves per 100 cow elk

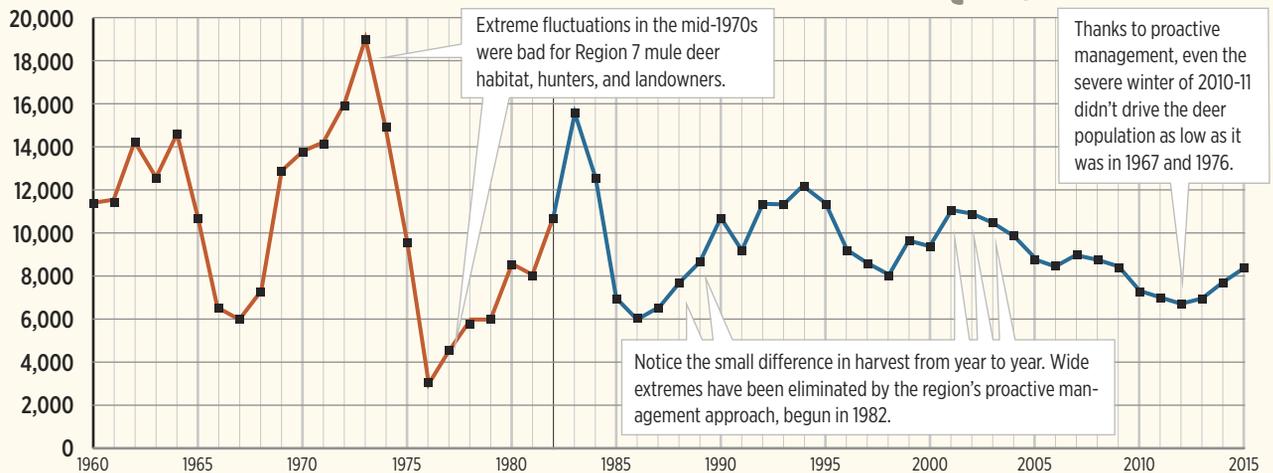


...But to find out for sure, FWP instituted a study that found it was mainly mountain lions, whose numbers had been increasing as well, that were eating the calves. FWP responded by increasing the harvest quota on lions, which then resulted in fewer lions and greater elk recruitment in recent years. The agency also reduced the cow elk harvest, which also has helped the population rebound.

The graph below, based on harvest data gathered over the past several decades, shows **FWP Region 7 mule deer populations** fluctuating widely in the 1960s and '70s. That occurred because FWP increased antlerless harvest too late to prevent overabundant deer from eating themselves out of house and home. The southeastern Montana region switched from this "reactive" management approach to a "proactive" strategy in 1982. By increasing doe harvest *before* deer numbers get too high, FWP has ironed out population extremes, benefiting habitat, landowners, and hunters.



**Region 7**  
**Mule deer**  
**buck harvest**  
1960–2015



Extreme fluctuations in the mid-1970s were bad for Region 7 mule deer habitat, hunters, and landowners.

Thanks to proactive management, even the severe winter of 2010-11 didn't drive the deer population as low as it was in 1967 and 1976.

Notice the small difference in harvest from year to year. Wide extremes have been eliminated by the region's proactive management approach, begun in 1982.

every winter from December 1 to January 15, when the animals are visible against the snow. The survey areas represent the most common mule deer habitats in each of FWP's seven regions and provide a representative sample. The same routes are flown again from March 15 to April 30, when deer concentrate in open areas during spring "green-up," to see how well both fawns and

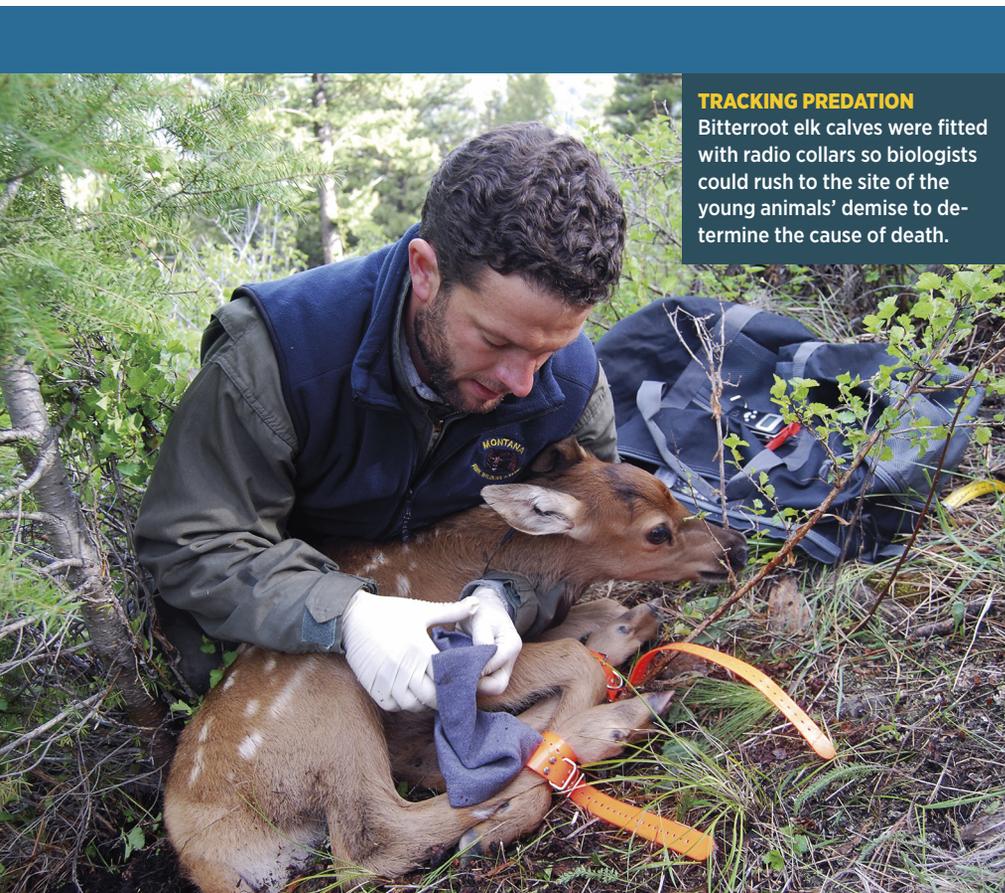
adults survived the winter.

To keep tabs on elk, biologists count bulls, cows, and calves each year between January and April, on days when snow cover is widespread and skies are clear along established routes over most of Montana's 162 elk hunting districts. Counts of young elk (measured as the number of calves seen per 100 cows) are especially

important, because that's how biologists know if reproduction is exceeding or falling behind adult mortality, indicating a growing or declining population.

Another way biologists get a sense of what's going on with local populations is by talking to landowners about the wildlife they see on their property, and by monitoring and addressing depredation complaints. "Few people see deer and elk more regularly than ranchers out checking their herds or fixing fences," Gude says.

MONTANA FWP



**TRACKING PREDATION**  
Bitterroot elk calves were fitted with radio collars so biologists could rush to the site of the young animals' demise to determine the cause of death.

**HOW HUNTERS HELP**

Yet another piece of the population puzzle is hunter harvest information gleaned from FWP's fall check stations and winter phone surveys. At the roughly one-dozen check stations across the state, hunters must stop and report their success. This provides biologists with "real-time" information during the hunting season, which they check against forecasts made earlier in the year.

Winter phone surveys are done by temporary, part-time FWP employees who interview nearly 100,000 hunters each year, about 60 percent of the total. Surveyors ask where hunters hunted and how they did. They also inquire if hunters saw any wolves or moose. Scientists have learned that sightings by deer and elk hunters are an effective way to track those especially hard-to-detect forest carnivores.

I sat in on several phone surveys this past

# “This might be the only personal interaction they have with FWP, so I want it to be as positive as possible.”

January at an FWP office in Helena, listening as Amber Feddes called hunters from across Montana and the United States.

“Hello, Darryl? My name is Amber and I’m calling from Montana Fish, Wildlife &

Parks hoping to get some harvest information,” she said on a call to a hunter in Miles City. “Do you mind answering a few questions about your season?”

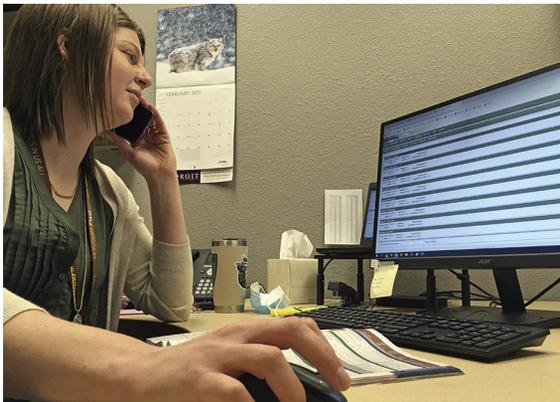
Feddes supervises 47 callers—mostly college students and retirees—working statewide who phone hunters selected randomly by a computer for a cross section of harvest results. Phone surveys typically begin in December and last through February.

“Let’s start with deer,” Feddes continues. “Did you have a chance to hunt deer? You did? Did you get any? Hey, that’s great. A buck? Wonderful. How

many points on each antler? Four by four? Good for you. Now, can you remember what hunting district you harvested the deer in?”

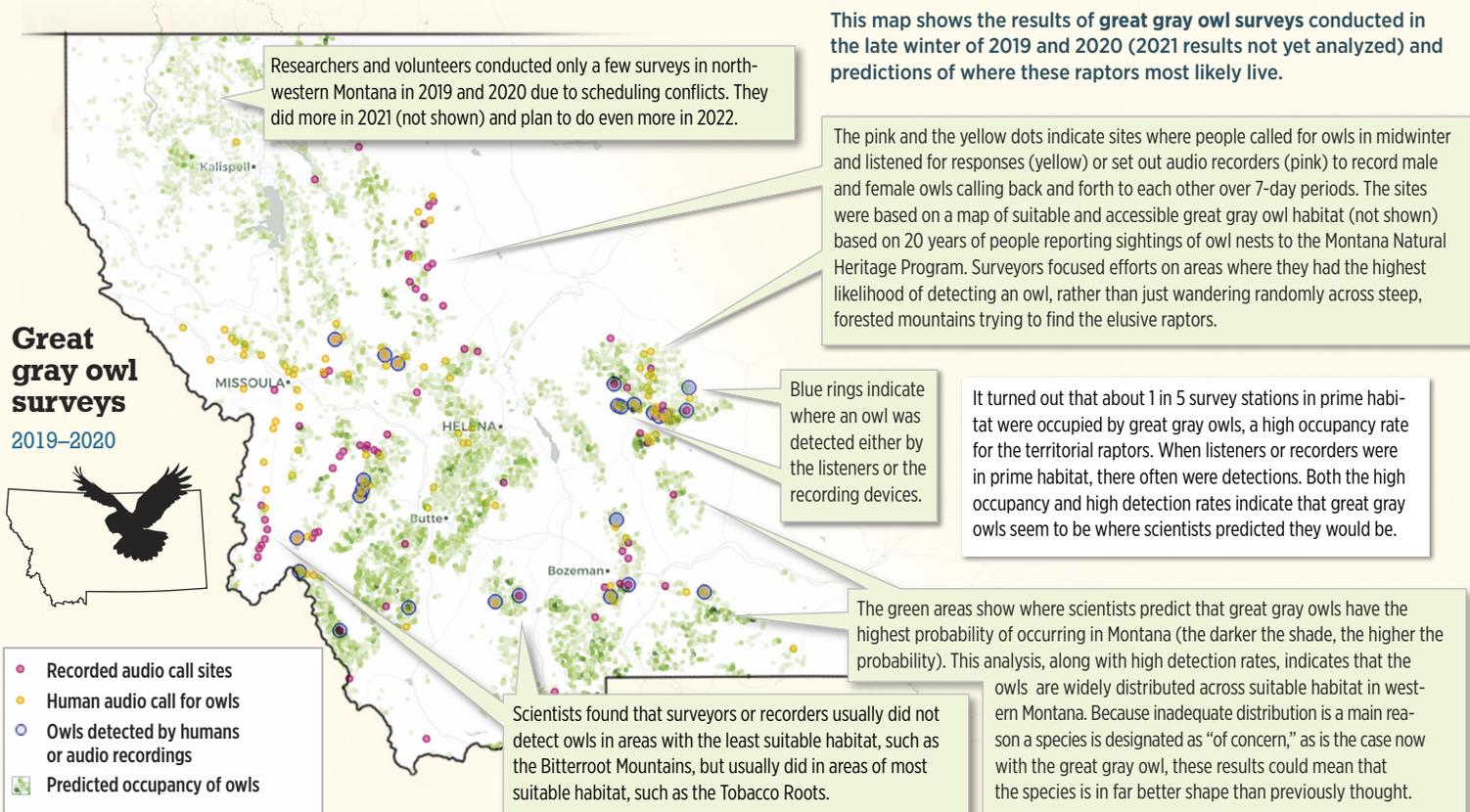
Though friendly, Feddes doesn’t have time for idle chit-chat. She aims to reach at least a dozen additional hunters this evening. “But if they have a question that I feel I can answer, I try to take the time to do that, or I direct them to the person who can,” she tells me. “This might be the only personal interaction they have with FWP, so I want it to be as positive as possible.”

According to Gude, harvest information usually corresponds closely with what biologists saw earlier in the year from the air. Not always, though. For instance, some years hunters harvest more animals than expected, requiring scientists to figure out why. “Maybe we undercounted elk that spring, or weather conditions made it easier for hunters to find elk. Or it could be there’s some other factor we don’t even know about,” he says.



**“HOW DID YOU DO?”** Some of FWP’s most valuable wildlife population information comes from hunter harvest surveys conducted by phone each winter by a team of callers. Shown here is harvest survey coordinator Amber Feddes interviewing a Miles City hunter about his 2020 mule deer hunt.

## MONITORING IN ACTION: Using population data to manage Montana’s wildlife

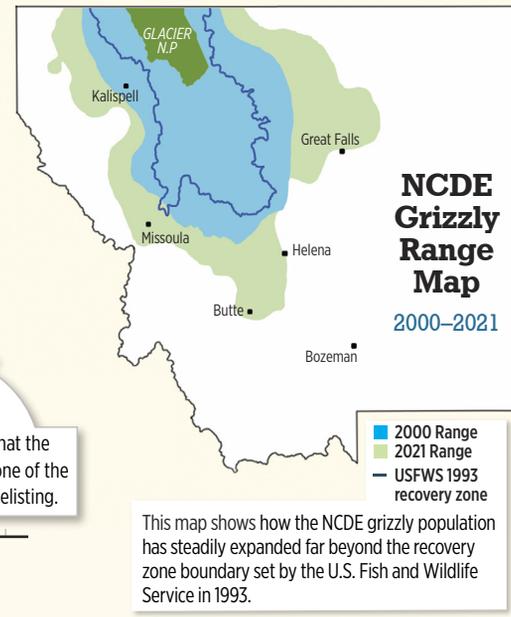
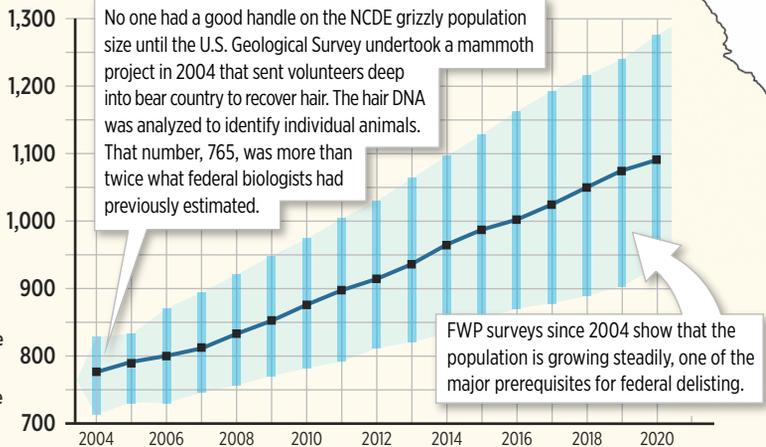


Only by scientifically documenting the Northern Continental Divide Ecosystem (NCDE) grizzly population growth and range expansion will Montana be able to make a convincing case that the population is fully recovered and can be safely delisted and returned to state management authority



**NCDE grizzly population 2004–2021**

Upper population estimate  
 Estimated grizzly count  
 Lower population estimate



**KNOWLEDGE GAPS**

Answering such questions is one reason FWP and other wildlife agencies constantly work to improve the scope and accuracy of counts. In the early 2000s, for instance, FWP biologist Rick Mace devised a way to use what was then relatively new DNA technology to survey Montana's black bear population across the species' 8,000-square-mile range. Volunteers set up scent stations surrounded by barbed wire that attracted bears. Snagged hairs later collected from the sites were sent to a genetics laboratory that identified a bear's species, sex, and unique genetic makeup.

The information showed that hunters were not overharvesting Montana's black bears, as researchers previously suspected. In fact, hunters were "hardly making a dent in the population," the now-retired Mace told *Montana Outdoors* in 2009.

FWP recently contracted with Hannah

Specht, a post-doctoral candidate at the University of Montana, to improve how the department estimates the population and range of chimney swifts, black-tailed jackrabbits, and several other nongame Species of Concern for which the agency lacked inventory information. For great gray owls, Specht identified the raptors' prime breeding habitat—rugged, steep, forested terrain with tall conifers—and mapped areas where surveys could be done. FWP nongame biologists in each region then coordinated visits to the sites by volunteers and FWP staff who either listened for owls or set up devices to record calls. A resulting range of likely occupied habitat shows that the large owls are probably well distributed, in low numbers, in high-quality habitat within their range.

Kristina Smucker, chief of the FWP Nongame Wildlife Bureau, notes that documenting a species' numbers and range is essential to maintaining state management. "If a rela-

tively uncommon bird like the great gray owl were petitioned for listing [as a threatened or endangered species] and we didn't even have the most basic information on where it is in the state and roughly how many are out there, there'd be a far greater chance that it would end up under federal protection," she says.

Gude notes that new techniques, technologies, and protocols are necessary because "we still don't know a lot about wildlife populations that we need to know," he says. "For example, we still don't have a good handle on elk populations in Region 1 [northwestern Montana] due to the thick forest cover. And we haven't found a way to count numbers and range of many nongame species, so we don't know how well they are faring."

Ken McDonald, head of the FWP Wildlife Division, adds that in many cases biologists can track population ups and downs but can't yet explain what drives the changes. "If we saw mule deer numbers dropping somewhere, we'd want to get in there and figure out why, so that, if possible, we could do something about it," he says.

Just like the individual animals themselves, wildlife populations are always in flux. Numbers and distribution constantly change in response to weather, disease, competition, and predation. To care for Montana's wildlife, biologists need to know how that wildlife is faring. "Without scientific monitoring, there would be no data to drive wildlife management," McDonald says. "We'd be left with little more than guesswork." 🐻

TOP TO BOTTOM: TOM DICASSON; DONALD M. JONES



**WISE APPROACH**  
 A new monitoring technique has allowed FWP nongame biologists to document a high occupancy rate of great gray owls and predict where the raptors live. The information shows that the forest owls may be in far better shape than previously thought.